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A Tool Kit for Affordable Home Developers

**California Energy Commission's  
New Solar Homes Partnership**

California's Incentive Program  
for New Residential Construction

**April 2009**

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This tool kit is updated regularly. For the most recent version, visit **[www.GoSolarCalifornia.org](http://www.GoSolarCalifornia.org)**

# About the NSHP Guide



### WHY THIS TOOL KIT HAS BEEN CREATED

The California Energy Commission's New Solar Homes Partnership (NSHP) incorporates affordable home developer outreach to provide California developers with the tools they need to face the unique challenges and costs associated with adding photovoltaic (PV) systems to their developments. As part of this effort, the Energy Commission created this Tool Kit for Affordable Home Developers to provide helpful information on the application and financing process and offers an abundance of resources to the affordable home developer.

### WHO SHOULD USE THE TOOL KIT

The Tool Kit for Affordable Home Developers has been developed for affordable home communities and specifically for non-profit developers that want to incorporate energy efficient and solar features into new affordable home communities. This tool kit is updated regularly. For the most recent version, visit [www.gosolarcalifornia.org](http://www.gosolarcalifornia.org).

### INSIDE THE TOOL KIT

The Tool Kit for Affordable Home Developers provides a step-by-step look at the application process and offers a comprehensive guide to help builders understand how the incentives available through the NSHP fit with other funding sources in the overall development process.

The following pages provide affordable home developers with guidance about NSHP and utility incentives, including: project-specific utility allowances, incentives and tax credits and the overlap between energy efficiency and solar programs tax credit. The kit also offers an in-depth resources section which provides information about net metering, the Energy Commission California Utility Allowance Calculator (CUAC) tool, information on training and outreach programs and information on green rating systems. Case studies of solar affordable home projects and news articles about solar affordable home projects tell the success stories of integrating energy efficiency and solar programs, design, construction and maintenance for solar PV systems. A glossary of terms and explanation of forms at the end of the kit will help affordable home developers better understand and maneuver the application process.

### ABOUT THE NEW SOLAR HOMES PARTNERSHIP

Launched in January 2007, the NSHP is a component of the California Solar Initiative, signed into law in 2006 under Senate Bill 1 (Murray) to implement Governor Schwarzenegger's \$3.3 billion, Million Solar Roofs Program.

The NSHP provides financial incentives and marketing support to affordable home developers, encouraging the construction of new, energy efficient solar homes that save homeowners money on their electric bills and helps protect the environment. The goals of the NSHP are to create a self-sustaining market for solar homes and gain affordable home developers commitment to install solar energy systems on new homes as a standard feature. A new home that qualifies for the New Solar Homes Partnership is at least 15 percent more efficient than the current building standards. The overall goal of the NSHP is to achieve 400 megawatts of new solar-produced electricity by the end of 2016.

### ABOUT THE CALIFORNIA SOLAR INITIATIVE

As part of California's efforts to increase renewable energy, Governor Schwarzenegger signed Senate Bill 1 (SB1), the Million Solar Roofs Plan, in 2006. Now known as the California Solar Initiative (CSI), SB1 established three goals: (1) to install 3,000 megawatts (MW), or approximately one million solar roofs, of distributed solar PV capacity in California by the end of 2016; (2) to establish a self-sufficient solar industry in which solar energy systems are a viable mainstream option in 10 years; and, (3) to place solar energy systems on 50 percent of new homes in 13 years.

This effort is a bold step forward in moving the state toward a cleaner energy future and lowering the cost of solar energy systems for consumers.

Go Solar California is part of the CSI and builds on 10 years of state solar rebates offered to customers in California's investor-owned utility territories: Pacific Gas & Electric (PG&E), Southern California Edison (SCE), and San Diego Gas & Electric (SDG&E).

The CSI statewide budget is \$3.3 billion over 10 years, distributed between three distinct program components: the California Solar Initiative (\$2.166 billion/1940 MW); the New Solar Homes Partnership (\$400 million/360 MW); and the Publicly Owned Utility Programs (\$700 million/700 MW).

With a 10-year commitment for solar incentives, and under legislative direction, California aims to build a self-sustaining solar industry with lower overall costs to consumers.

### ABOUT THE CALIFORNIA ENERGY COMMISSION

Created by the Legislature in 1974, the California Energy Commission is the state's primary energy policy and planning agency. The Energy Commission has six major responsibilities: forecasting future energy needs and keeping historical energy data; licensing thermal power plants 50 MW or larger; promoting energy efficiency through appliance and building standards; developing energy technologies and supporting renewable energy; conducting research, development and commercialization programs for new energy technologies; and planning for (and directing) State response to an energy emergency.

### ABOUT THE NSHP AFFORDABLE HOME DEVELOPER OUTREACH PROGRAM

The NSHP's Affordable Home Developer Program was designed to work with residential builders, affordable home developers, and the solar industry to create a self-sustaining market for solar homes. The goal is for affordable home developers to build projects that offer high levels of energy efficiency with high performing solar systems to reduce the residents' electric bills significantly. The purpose of this guidebook is to provide affordable home developers with a thorough understanding of the advantages of participation in the New Solar Home Partnership.

The NSHP provides financial incentives up to \$3.50 per watt in rebates. It also provides technical assistance and other support to affordable home developers who install eligible solar photovoltaic (PV) systems on new residential buildings that receive electricity from investor-owned utilities.



# New Solar Homes Partnership

## ABOUT THE NSHP GUIDE

Along with the financial incentives, the NSHP provides non-financial support services. These include advice on maintenance and technical assistance to affordable home developers. The Energy Commission's goal is to assist the affordable home industry in designing, building and managing new energy efficient solar homes.

A new single-family home or multifamily project that qualifies for the NSHP must achieve energy efficiency levels greater than required by the current Building Title 24 Standards. The investor-owned utilities (PG&E, SCE, SDG&E) offer energy efficiency incentive programs for new construction to assist in offsetting first-costs of incorporating energy efficiency measures.



# Application Guidelines



# New Solar Homes Partnership

## APPLICATION GUIDELINES

### Quick Reference Checklist

(See below for a more detailed description.)

- ☐ Download the NSHP Guidebook
- ☐ Start Early and Hire a CEPE Certified Energy Consultant
- ☐ Select a PV Retailer/Vendor and PV Equipment
- ☐ ‘Energy Efficiency First’: Apply for utility new construction incentives
- ☐ Submit Solar Reservation Application
- ☐ Await Approval of the Application from the NSHP
- ☐ Hire a solar-qualified HERS Rater to conduct field verification
- ☐ Install PV
- ☐ Schedule HERS field verification
- ☐ Submit Incentive Claim

### How to Apply

#### STEP 1 - Gather Resources

Download the NSHP guidebook that is available on the Energy Commission’s Go Solar California website at: [www.gosolarcalifornia.org/documents](http://www.gosolarcalifornia.org/documents).

*Note: Only new homes built within Pacific Gas and Electric, Southern California Edison, San Diego Gas & Electric and Golden State Water Company (doing business as Bear Valley Electric Service) service areas are eligible for incentives under the NSHP.*

Select a **Certified Energy Plans Examiner (CEPE)**. CEPEs are certified by the California Association of Building Energy Consultants (CABEC). They offer technical expertise with Title 24 Building Energy Efficiency Standards compliance analysis and energy efficiency documentation for the NSHP.

Ask the CEPE to analyze how best to meet the Tier I or Tier II energy efficiency levels for your project. Arrange for them to complete the analysis and the CF-1R (Certificate of Compliance: Residential) form for each project (this will include both the CF-1R and the CF-1R-PV forms).

Select a renewable energy retailer. A list of registered retailers and vendors is available online at: [www.gosolarcalifornia.ca.gov/retailers/index.html](http://www.gosolarcalifornia.ca.gov/retailers/index.html).

#### STEP 2 - Save Money, Plan Ahead

Keeping costs down while “going green” requires advanced planning. The requirement to exceed the Title 24 code by 15% or 35% is a crucial part of the application process.\*

Review building plans and Title-24 documentation to determine if your project meets this requirement. By planning ahead to reach these energy efficient goals you will avoid expensive design changes later in the process.

Apply for the permit for your photovoltaic system with the appropriate city/county building department.

\*Amended guidelines for Senate Bill 1 (Murray) were adopted at the December 3, 2008 Energy Commission Business Meeting. One of the key revisions will update the energy efficiency requirement for newly constructed builders by defining the Tier I and Tier II levels. This will reflect the adopted 2008 Title 24 (Part 6) Building Energy Efficiency Standards for building permits submitted on or after August 1, 2009.



# New Solar Homes Partnership

## APPLICATION GUIDELINES

### STEP 3 – Select Photovoltaic Retailer/Vendor & Eligible Equipment

Select eligible equipment (PV modules, inverter and meter) to purchase for your project. A list of eligible equipment is available online at: [www.gosolarcalifornia.ca.org/nshp/eligible\\_pv.html](http://www.gosolarcalifornia.ca.org/nshp/eligible_pv.html).

Select a licensed contractor who will install the system(s). Contractors must have an active A, B, C-10 or C-46 license. Many providers also install their equipment. *Part of this step will include an NSHP PV Calculator\* estimate which will use the proposed size of PV system and its location, etc. to determine the amount of incentive received.*

Determine who will be completing the expected performance analysis for each PV system using the NSHP PV Calculator. This might be the CEPE qualified energy consultant who does your energy efficiency analysis, or the retailer/vendor of the PV equipment. Arrange for the expected performance analysis to be completed and documented on the CF-1R-PV form. The individual who completes the analysis and documentation must be familiar with the correct inputs for each PV system you plan to install. This individual will also need to coordinate with your retailer/installer to review the site plan for each system or know that you intend to meet the California Flexible Installation criteria. Instead of specific details about your site, the California Flexible Installation criteria are generic specifications, and as such, may underestimate your system's performance.

*\* For more information on the NSHP PV Calculator, please see the Resources section.*

### STEP 4 – Energy Efficiency First: Apply for Utility New Construction Program Incentives

You may be eligible for additional incentives for energy efficiency measures from your local investor-owned utilities.

The investor-owned utility companies (IOUs) are coordinating the requirements for energy efficiency incentive programs as well as the solar incentive programs. This simplifies the process for the developer. Expect to complete a separate IOU energy efficiency program application and provide the CF-1R (Certificate of Compliance: Residential form) at the time of application.

## LOCAL UTILITY ENERGY EFFICIENCY PROGRAM CONTACTS:

PACIFIC GAS AND ELECTRIC

**Residential New Construction:** NEW SOLAR HOMES PARTNERSHIP PERFORMANCE METHOD  
(single family detached homes)

PG&E INTEGRATED PROCESSING CENTER

RESIDENTIAL NEW CONSTRUCTION

P.O. Box 7265

San Francisco, CA 94120-7265

877-443-4112

[www.pge.com/mybusiness/energysavingsrebates/incentivesbyindustry/newconstruction/rncnshp](http://www.pge.com/mybusiness/energysavingsrebates/incentivesbyindustry/newconstruction/rncnshp)

# New Solar Homes Partnership

## APPLICATION GUIDELINES

CALIFORNIA MULTIFAMILY NEW HOMES (CMFNNH): PERFORMANCE METHOD  
*This PG&E program is implemented by a third-party organization, Heschong Mahone Group, Inc.*  
CALIFORNIA MULTIFAMILY NEW HOMES  
HESCHONG MAHONE GROUP, INC.  
*11526 Fair Oaks Blvd. Suite #302*  
*Fair Oaks, CA 95628*  
*866-352-7457*  
*[www.h-m-g.com/multifamily/cmfnh](http://www.h-m-g.com/multifamily/cmfnh)*

SCE  
CALIFORNIA NEW HOMES PROGRAM – ENERGY EFFICIENCY  
*6042A North Irwindale Avenue*  
*Irwindale, CA 91702-3207*  
*866-584-7436*  
*[www.sce.com/residential/rebates-savings/csi](http://www.sce.com/residential/rebates-savings/csi)*

SAN DIEGO GAS AND ELECTRIC  
ADVANCED HOME PROGRAM  
*8335 Century Park Court, CP12G*  
*San Diego, CA 92123*  
*866-631-1744*  
*[www.sdge.com/builderservices/newHomes.shtml](http://www.sdge.com/builderservices/newHomes.shtml)*

### **STEP 5 - Download New Solar Homes Partnership Reservation Application and Apply Online**

To secure a rebate, the developer will need to contact the relevant (serving) IOU to get information on their application process. All affordable projects are eligible for a 36 month reservation period.

Download and complete the Reservation Application Form NSHP-1 that is included in the NSHP Guidebook. The application is available online at: [www.gosolarcalifornia.ca.org/documents](http://www.gosolarcalifornia.ca.org/documents).

Ensure your application is complete, and that it conforms to the instructions and directions in the NSHP Reservation Application Checklist, available online at:

[www.gosolarcalifornia.org/builders/applying.html](http://www.gosolarcalifornia.org/builders/applying.html).

Incomplete applications will result in delayed approvals.

When possible, submit NSHP reservation applications indicating that you are participating in an IOU energy efficiency incentive program. This can be in the form of a program acceptance letter if your project has already met program requirements and passed the required energy efficiency plan review, or a letter indicating your intention to enroll in the energy efficiency incentive program. This is not required, but will expedite the application process.

Contact your utility company for details on mailing your application. The IOUs, rather than the Energy Commission staff, will process NSHP forms. Contact your IOU directly.

# New Solar Homes Partnership

## APPLICATION GUIDELINES

### UTILITY CONTACT INFORMATION

Mail the completed reservation application to one of the following program administrators based on where your project is located:

PACIFIC GAS AND ELECTRIC COMPANY  
SOLAR AND CUSTOMER GENERATING (NSHP)  
*P.O. Box 7433*  
*San Francisco, CA 94120*

#### *Overnight deliveries:*

PG&E  
SOLAR AND CUSTOMER GENERATION (NSHP)  
*245 Market Street, Mail Code N7R*  
*San Francisco, CA 94105-1797*  
[www.pge.com/mybusiness/energysavingsrebates/solar/nhshp/shtml](http://www.pge.com/mybusiness/energysavingsrebates/solar/nhshp/shtml)

SOUTHERN CALIFORNIA EDISON COMPANY  
SCE  
CALIFORNIA NEW HOMES PROGRAM – ENERGY EFFICIENCY  
*6042A North Irwindale Avenue*  
*Irwindale, CA 91702-3207*  
[www.sce.com/RebatesandSavings/bb/cali-new-homes/california-new-homes-program.htm](http://www.sce.com/RebatesandSavings/bb/cali-new-homes/california-new-homes-program.htm)

SAN DIEGO GAS AND ELECTRIC COMPANY  
NEW SOLAR HOMES PARTNERSHIP  
*8335 Century Park Court, CP12G*  
*San Diego Ca. 92123*  
[www.sdge.com/construction](http://www.sdge.com/construction)

### **STEP 6 – New Solar Homes Partnership Application Review**

Your application will be reviewed for eligibility. You will receive an approval form (NSHP-2 or NSHP-1.6)\* when your application for a reservation has been approved.

Systems installed in affordable home projects, must be completed within 36 months of the approval date. When applicable, be aware of checkpoint requirements (you may need to provide confirmation of progress). See the NSHP Guidebook for additional information.

### **STEP 7 – Home Energy Rating System (HERS)**

Contact an approved HERS provider to arrange and hire a HERS Rater to complete field verification of your project. This HERS Rater must be certified to inspect solar systems and energy efficiency measures ('Solar Certified Rater'). Inspections will need to be scheduled during construction, not just after completion. More information on HERS is available online at: [www.energycalifornia.org/HERS](http://www.energycalifornia.org/HERS).

\* NSHP 1.6 is a conditional approval and requires applicant to submit equipment purchase/agreement documentation within six months after NSHP 1.6 is approved. Applicant will then be issued an NSHP-2 form(s).

# New Solar Homes Partnership

## APPLICATION GUIDELINES

*There are currently three HERS Providers:*

- *CalCERTS Home Energy Rating System*  
[www.calcerts.com](http://www.calcerts.com)
- *The California Building Performance Contractors Association (CBPCA)*  
[www.cbPCA.org](http://www.cbPCA.org)
- *The California Home Energy Efficiency Rating System (CHEERS)*  
[www.cheers.org](http://www.cheers.org)

These sites will allow you to search for a rater based on the location of your project. Ensure that you communicate with your rater that they will be conducting both a verification of the 'Energy Efficiency First' measures (measures that brought your project to a minimum of 15 percent above Title 24) in addition to the solar inspection requirements. This will prevent you from having to hire two separate raters to fulfill requirements for the utility new construction energy efficiency incentive program and the NSHP requirements. Contact your local utility for inspection requirements.

Provide the CF-1R (Certificate of Compliance: Residential) for the energy efficiency measures and the CF-1R-PV for the photovoltaic system to your HERS Rater and ensure that these forms are also included in the Reservation Application Package. The HERS Rater will upload the verification data into his/her provider registry as specified upon completion of the verification.

### **STEP 8 - Photovoltaic (PV) Installation**

Energy efficiency measures and PV systems must be installed consistent with the CF-1R (Certificate of Compliance: Residential) and the CF-1R-PV (Expected Performance Base Incentive calculations form).

If there are any changes to the energy efficiency measures after the CF-1R form is submitted, notify the utility provider's New Construction Energy Efficiency Program representative at the time of the change to obtain approval. Failure to do so may result in your project becoming ineligible for incentives.

Changes to either the energy efficiency measures or the PV system installation must be documented in a revised CF-1R and/or CF-1R-PV form. Revised documentation must be submitted to the utility provider's New Construction Energy Efficiency Program and provided to the HERS provider for inclusion in the HERS provider's data registry.

Make sure that the contractor(s) complete(s) the CF-6R form for the energy efficiency measures for the project, including diagnostic testing if necessary. Also make sure the PV installer completes the CF-6R-PV form for each PV system, making all needed system checks. Provide copies of each CF-6R and CF-6R-PV to the HERS Rater.

The developer must provide both the installer and the HERS Rater with a site plan that: a) identifies the location and species of all pre-existing, planted and planned trees and the location and height of any structures that will be built on the lot of the building with the solar system and neighboring

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lots (the extent they are known): and, b) shows the bearing of the property lines, the azimuth and tilt or roof pitch of each PV array.

### **STEP 9 – Home Energy Rating System (HERS) Verification**

A HERS Rater must verify the installed energy efficiency measures and each PV system once it is installed and operational. Some inspections will be needed during the construction. The HERS Rater will complete any required diagnostic testing and field verification for each of the energy efficiency measures needed to meet Tier I or Tier II levels and complete the CF-4R form. The HERS Rater will also complete the field verification of each PV system and complete the CF-4R-PV form. Both the CF-4R and the CF-4R-PV forms must be generated through the HERS Provider's data registry. If the CF-4R or CF-4R-PV forms indicate that the actual energy efficiency measures or the actual PV installation are inconsistent with the CF-1R or the CF-1R-PV, either the installation must be changed to match the form, or the CF-1R or the CF-1R-PV forms must be changed to match the actual installations. To receive the rebates, the project as built must meet the appropriate energy efficiency Tier level, and the PV system rebate calculation must match the installation.

### **STEP 10 – Submit Your Rebate Claim**

Rebate claim processing can also be done online at [www.newsolarhomes.org](http://www.newsolarhomes.org). The general process is: Complete and mail your rebate payment claim form NSHP-2 with all supporting documents to your utility's NSHP program representative. Review the checklist on the Payment Claim Form for required supporting documents. Make sure that the final rebate calculations on the CF-1R-PV are consistent with the final CF-4R-PV for each PV system.





# Incentives



# New Solar Homes Partnership

## INCENTIVES

### NEW SOLAR HOMES PARTNERSHIP INCENTIVES

#### LOWER COSTS

A variety of incentives and tax credits are available to lower the costs of adding energy efficiency measures and photovoltaic (PV) system equipment in new affordable home construction.

#### AFFORDABLE HOMES DEFINED FOR INCENTIVES PURPOSES

Incentive-eligible projects must be multifamily and/or single-family developments where at least 20 percent of the project units are reserved for extremely low, very low, lower or moderate income households for a period of at least 45 years. Solar energy systems must be connected to, and serving the energy needs of, 1) residential units subject to affordability requirements, 2) the office and residential unit of the project manager, provided all other residential units in the project are subject to affordability requirements, or 3) the common areas of the project, where all of the project's units are reserved for extremely low, very low, lower or moderate income households, except for the manager's unit. Examples of common areas include, but are not limited to: hallways, recreation rooms, manager's unit and tenant parking.

#### INCENTIVES FOR AFFORDABLE HOMES WITH SOLAR

The NSHP provides an Expected Performance Based Incentive (EPBI) using a specific dollars-per-watt amount applied to the Energy Commission-specified reference solar energy system. There are two incentive levels available for installing solar panels on residential buildings. The EPBI amount is based on the reference system receiving this \$3.50/watt for systems that power units and \$3.30/watt for systems that power common areas. The incentive amount for each applicant solar energy system is determined by analysis using the PV Calculator, and is paid when the solar system has been installed and approved by the local building authority, and all program requirements have been met. Detailed information on how the incentive amount is determined can be found in the NSHP Guidebook. Eligible projects will receive a 36-month reservation period.

Incentives will decline over the life of the program, with the program's application process closing no later than the end of 2016. Incentive levels and reserved volume are subject to funding availability. A 30-day notice of incentive decline will be posted on the Go Solar California website when incentives are anticipated to drop.

### OTHER NSHP PARTICIPATION BENEFITS

In addition to environmental benefits and economic incentives for incorporating solar in your affordable homes project, the NSHP also provides some participation benefits to you and your project depending on the level of energy efficiency and solar achieved from your system(s).



### SOME OF THESE BENEFITS MIGHT INCLUDE:

- Being listed as a solar-friendly community and featured on an interactive map of solar home communities on the GoSolarCalifornia.org web site
- Ability to co-brand and produce information materials from the NSHP campaign
- Standard NSHP language in press releases about new solar communities
- The Energy Commission's quote in builder press releases announcing community ground-breaking and opening – will include NSHP seal
- Recognition plaques for your project
- Featured on a rotating basis on NSHP website banner
- Assistance with local media outreach to promote new development grand opening

## UTILITY INCENTIVE PROGRAMS

This section describes in more detail the incentives and processes of the 'Energy Efficiency First' utility new construction programs. PG&E, SCE, SDG&E and some municipal utilities offer solar incentives to affordable home developers for both multifamily and single-family housing.

### PACIFIC GAS & ELECTRIC INCENTIVE PROGRAMS

#### *Multifamily*

California Multifamily New Homes requires 15 percent above standard Title 24 minimum requirements. To help in meeting this threshold, the program offers technical design assistance (at no fee) and an energy consultant incentive. In meeting this threshold, the developer may qualify for additional resources including: Low Income Housing Tax Credits, Energy Efficiency-Based Utility Allowance, and green building grants through Enterprise's Green Communities or the Local Initiatives Support Corporation. Developers can also upgrade to the California ENERGY STAR® New Homes Program by meeting the specifications of the U.S. Environmental Protection Agency.

Please check with the program current incentive rates at:

[www.h-m-g.com/multifamily/cmfnh](http://www.h-m-g.com/multifamily/cmfnh)

#### *Single Family*

PG&E also offers single-family incentives for solar. Developers can receive incentives at two different tier levels. Both tiers require that all appliances provided by the builder must be ENERGY STAR qualified.

- Tier 1 – 15% above Title 24
- Tier 2 – 35% above Title 24 (see page 6 for more information)

(Please note that Tier 2 currently only exists for single family detached homes, but utilities are exploring the feasibility of including this tier in the 2009-11 multifamily new construction programs. Tier 2 projects must also demonstrate a 40 percent reduction in cooling load and include solar generation as an option.)

Developers can upgrade to the California ENERGY STAR® New Homes Program by meeting the specifications of the U.S. Environmental Protection Agency or the New Solar Homes Performance Method.

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## INCENTIVES

### SOUTHERN CALIFORNIA EDISON INCENTIVES PROGRAMS

The California New Homes Program will award a limited number of financial incentives to developers who construct homes that exceed California's Title 24 energy efficiency standards for new residential construction.

This program is available for both single and multifamily new homes. In addition to financial incentives, developers accepted into the program may take advantage of training opportunities, technical support and marketing resources.

SCE has now combined program requirements and benefits for residences that meet the energy efficiency and solar requirements.

### SAN DIEGO GAS AND ELECTRIC TERRITORY

The Advanced Home Program offers incentives for new home construction that exceed Title 24 by at least 15 percent. In addition, these homes can qualify for the Energy Star for Homes label. Some of the training programs and solar programs are run by California Center for Sustainable Energy (CCSE), while energy efficiency programs are run by SDG&E.

There are two levels of participation:

- Tier 1 – Exceed Title 24 compliance by 15 percent for single and multifamily new home construction
- Tier 2 – Exceed Title 24 compliance by 35 percent and 40 percent in cooling budget for single or multifamily new construction. (see page 6 for more information)

The Advanced Home Case Studies program strives to create a comprehensive case study portfolio of projects that include energy, resources and the environment. For these projects, SDG&E will offer resources to developers.

SDG&E also offers Title 24 training classes for residential new construction projects.

*Please check with your local utility for the program's current incentive rates.*

*Resources: For more information on state incentives, please visit:*

*[www.csi-trigger.com](http://www.csi-trigger.com)*

*You may also be eligible for local rebates. Please visit the following sites for more information:*

*[www.flexyourpower.org](http://www.flexyourpower.org)*

*[www.dsire.org](http://www.dsire.org)*



### ECONOMIC REASONS FOR UTILIZING SOLAR PHOTOVOLTAICS

There is a misconception that investment in energy efficiency and renewable energy necessarily raises the cost of construction so much that residences can no longer be kept affordable. This toolkit and utility-funded training programs can help increase developers' understanding as to how they can achieve very efficient designs at very low marginal cost and all of the economic incentives available for including solar PV in projects.

The purpose of this section is to demonstrate how incorporating energy efficiency and distributive energy technologies like solar PV systems into affordable home projects not only helps individual residents' budgets, but also contributes to community development, another goal of many affordable home developers.

### THE INDIVIDUAL & COMMUNITY BENEFITS OF EFFICIENT BUILDINGS & THE MULTIPLIER EFFECT

Many of the decisions that effect energy costs in affordable residences are made by the project developer, the architects and engineers who work for the developer, and the contractors who build and equip the buildings. Two major opportunities of energy-efficient affordable home developments are tenant savings and resulting community development.

An increase in tenants' available dollars resulting from their savings on energy bills will provide an increase in economic activity in a community. If a tenant visits a local hairdresser, for example, the hairdresser will turn around and spend a portion of each dollar s/he receives from the tenant on hair care products, payroll, advertising, janitorial services, other local business services, and energy. Some of these dollars are then spent again locally by these recipients.

The impact of money that is spent again and again locally is known as the "multiplier effect." The California Technology, Trade and Commerce Office in 2004 calculated the local multiplier effect of a dollar spent for different kinds of purchases. Because of the multiplier effect, a dollar spent on energy is worth about \$2.12 to the local community. However, a dollar spent on the market basket of goods that a typical affordable home resident would buy is actually worth about \$4.00 to the local community. So for every dollar that a tenant is able to spend locally on goods instead of energy, that dollar is ultimately worth an additional \$1.88 to the community (\$4.00 multiplier minus \$2.12 multiplier for energy spending). This means that taking advantage of federal and state incentives for solar not only helps a project pencil out, but also provides direct dollar benefits to the tenants and the local community through tenant spending.

### ENERGY EFFICIENCY SHOULD BE THE FIRST STEP IN ANY SOLAR INSTALLATION PROJECT

Finally, it is worth noting that intelligent investments in solar should happen in concert with investments in energy efficiency. Because efficiency costs so much less than PV, it makes economic sense to adopt all cost-effective energy efficiency measures first to reduce the size of the PV system that is needed. Affordable home project designs should first minimize loads (e.g. by including features that slow heat losses in the winter and slow heat gains in the summer), then adopt more efficient equipment, and finally include PV to meet as much of the remaining load as possible.



# Resources



This section includes helpful information for developers on project-specific utility allowances, net metering, incentives and tax credits, the overlap between energy efficiency and solar programs tax credit, integrating energy efficiency and solar program, design, construction and maintenance for solar photovoltaic equipment, training and outreach as well as useful information on California solar code. It also includes some information on green rating systems.

The latter part of the section offers helpful links to the developer on the New Solar Homes Partnership resource information and New Solar Homes Partnership working group member information.

### PROJECT-SPECIFIC UTILITY ALLOWANCES

Developers of affordable homes are required to estimate their target tenants' costs of utilities when seeking to obtain Low-Income Housing Tax Credits for new projects from the California Tax Credit Allocation Committee (TCAC). Past IRS rules required that estimates used in these applications had to be based either on a utility allowance schedule adopted by the local public housing authority or developed in cooperation with the local utility company. Both overestimated tenants' utility costs.

To ensure that affordable homes are truly affordable, HUD and other agencies require that developers determine the total "housing burden" to be no more than 30% of tenants' disposable monthly income. The housing burden covers both rent and tenant-paid utility costs. For some projects, if the rents are too low because estimated tenants' utility costs are overestimated, there will be too little net monthly income to service the debt required for construction, and the lenders (as well as TCAC) will not participate in the project. For other projects that can be built, overly high utility allowances will cause them to result in the projects being scaled back, or requiring a greater infusion of public funds to be completed.

With the advent of the Energy Commission's New Solar Home Partnership (NSHP), the affordable home community and the Energy Commission recognized a need to develop more accurate utility estimates. In late 2007, that Energy Commission began developing a project-specific utility allowance tool to make more accurate estimates of tenants' utility costs. It is called the California Utility Allowance Calculator (CUAC). New IRS rules effective July 2008 allow for the use of an energy consumption model approved by TCAC. By October 2008, the tool, the California Utility Allowance Calculator (CUAC), was completed and it was approved by the Energy Commission in November of 2008. TCAC approved the CUAC as the official energy consumption model method for California, under the current IRS regulations, on February 25, 2009. By using the CUAC, owners of affordable homes will be better able to realize a reasonable rate of return on their investment in energy efficiency and PV.

### CALIFORNIA UTILITY ALLOWANCE CALCULATOR (CUAC)

The CUAC tool provides improved estimates of tenants' utility costs based on the characteristics of the specific project. It was created under contract with the California Energy Commission for developers to estimate tenants' utility costs on LIHTC funded projects.

The CUAC tool must be used by a professional who is (1) a CEPE, and (2) either a California licensed engineer (mechanical or electrical) or a HERS Rater.

The CUAC tool relies on the following structure:

- EnergyPro kWh and kBtu (1,000 British thermal units) output for heating, cooling and hot water
- Solar kWh inputs come from the Energy Commission PV program
- Lighting, cooking and appliance energy are calculated within CUAC based on:
  - Description of units
  - Choice of Energy Star appliances (or not)
  - Choice of high efficacy lighting (or not)
- Water and sewer are user inputs based on local fee structure

To use the CUAC, the developer must:

- Describe the project:
  - Electricity provider
  - Gas provider
  - Utilities paid by tenants
  - Number of units by type – (# of bedrooms)
  - Address, owner info, etc.
  - Percent of solar to common area (if PV included)
- Obtain output from EnergyPro
- Obtain output from CEC PV (if project includes PV)

All forms from the CUAC must be submitted with the appropriate signatures. CUAC analysis must be redone at the time of lease up. The owner must review the utility allowance annually using the CUAC version current at the time, which will have the current utility tariffs.

For detailed information, please visit: [www.gosolarcalifornia.org/affordable\\_housing/cuac.html](http://www.gosolarcalifornia.org/affordable_housing/cuac.html).

## NET METERING

Net metering refers to the ability of the customer to use their own solar or wind electric generation to offset their consumption over a billing period by permitting electric meters to turn backwards when their systems produce electricity in excess of their demand. Unlike single-family solar installations, PV systems installed on multifamily buildings face a unique set of issues in getting the power from the system into the multiple housing units. California Public Utilities Commission (CPUC) rules require that all new multifamily dwellings have individual electric meters, so multifamily developers have to choose among several options:

### *(1) Provide PV connected to the common area meter and sized for the common area load.*

This option is viable with little effort on the developer's part and is used fairly widely today. However, it provides little or no benefit to the tenants and results in a much lower level of installed PV wattage than could be realized, because no PV is installed for the tenant loads.

### *(2) Provide individual PV systems (including individual inverters) for each tenant space.*

This option is available today and has been used by a few projects in California (see SOLARA case study in Section 5.1). However, this approach is currently costly, because instead of having one array sized for the whole load and one inverter, the developer must invest in as many inverters as there are tenants. This again results in less PV wattage installed than could be and at a higher per-watt cost.

### *(3) Let someone else own the system and contract with them for some of the benefits.*

This third option is also possible today and some projects have used this approach. It requires the developer to identify and negotiate a contract with a system owner, and then requires the system owner to negotiate a power purchase agreement (PPA) with the responsible utility. Developers who choose this approach give up a substantial portion of the economic benefits of PV to this “middle man.” PPAs may also require significant up-front work on the part of the developer. The benefit of entering into a PPA is that end-users will receive a discounted guaranteed rate for power over the PPAs life (15 years). Note that PV systems on affordable home projects treated in this manner would likely be considered commercial property, and commercial property is not considered “eligible basis” for the purpose of the Low Income Housing Tax Credit program (see below).

### *(4) Make a special net metering arrangement with the utility company.*

This arrangement is technically possible, but requires the serving utility to request CPUC approval through an advice letter. The ratio of that net usage to the total usage on the property is applied via the utility’s billing software to the energy usage recorded on each tenant’s individual utility meter to determine each tenant’s monthly purchased energy. This is similar to a master-meter situation with sub-meters, except that all of the meters in this approach are utility-provided meters.

### *(5) Virtual net metering*

Virtual Net Metering (VNM) is another option being developed by the IOUs in collaboration with the CPUC. It could eliminate the need for multiple inverters, third-party ownership, or special metering arrangement with the IOU. As of the first quarter of 2009, CPUC is still finalizing the rules on how VNM would work and to what projects it might apply. It is expected that by the second quarter of 2009, VNM will be available to NSHP projects. For the latest information, please go to: [www.cpuc.ca.gov/puc/energy/solar](http://www.cpuc.ca.gov/puc/energy/solar).

## TAX CREDIT ALLOCATION COMMITTEE, CALIFORNIA DEBT LIMIT ALLOCATION COMMITTEE, HOUSING AND URBAN DEVELOPMENT APPLICATION GUIDELINES: OVERLAP WITH NSHP APPLICATION GUIDELINES

*The application guidelines for the California Tax Credit Allocation Committee (TCAC), and the U.S. Department of Housing and Urban Development (HUD) and the New Solar Homes Partnership closely overlap with one another. It is important to note this when reading the following information.*

When it comes to financing affordable home developments, developers often use multiple lenders in various financing structures to make deals work. There are three ways to finance solar photovoltaic systems on affordable new construction projects: tax credits (Low Income Housing Tax Credits and Solar Investment Tax Credits), increased supportable debt from reduced utility allowances, and grants and rebates.

### TCAC REGULATIONS

The California Tax Credit Allocation Committee (TCAC) administers two federal **Low-Income Housing Tax Credit (LIHTC) Programs**. A capped competitive or “nine percent” program, and a noncompetitive or “four percent” program. Both programs were created to encourage private investment in affordable rental housing for households meeting certain income requirements. Because TCAC offers points for solar installations and energy efficiency in its application process, TCAC and the Energy Commission have cooperated in making the application processes work together. For TCAC’s current scoring criteria and guidelines, please see the following: [www.treasurer.ca.gov/ctcac/program.pdf](http://www.treasurer.ca.gov/ctcac/program.pdf).

### INCREASE IN THRESHOLD BASIS LIMITS

Eligible basis is a key concept in the LIHTC program. Credit awards are determined in part by the amount of eligible basis a development has. Essentially, eligible basis is depreciable residential costs – meaning your solar PV system can be considered eligible basis. TCAC limits the amount of eligible basis that can be claimed through a system of “threshold basis limits” but allows for increases in those limits for certain types of costs. You can apply for an increase in threshold basis limits for renewable energy sources, such as solar photovoltaic. In order to apply for the basis limit increase, you need to provide TCAC with a letter from a solar provider, a certified mechanical engineer or energy analyst that estimates the total cost of the PV system and the expected operating cost savings provided by the renewable energy system for the duration of the compliance period. Additionally, since all projects that are eligible for NSHP incentives must be at least 15% better than current Title 24, Part 6 standards, they may also be able to apply for additional basis limit increases with TCAC.

***Important note: In order for new construction projects to be eligible for other state photovoltaic incentives, they must exceed Title 24, Part 6 standards by 15 percent or more. This requirement overlaps with a number of TCAC criteria, including:***

1. Competitive nine percent tax credit projects can claim four of the eight points needed to maximize points in the sustainable building methods section by committing to perform 10 percent better than Title 24 and then commit to performing 15 percent better than Title 24 via the four percent sustainable building methods threshold basis limit increase section of the Qualified Application Plan.
2. Competitive nine percent tax credit projects can claim the maximum four of the eight points in the sustainable building methods section by committing to certify the project through Leadership in Energy & Environmental Design (LEED for Homes), Green Communities or the GreenPoint Rated Multifamily Guidelines. Each of these rating systems requires that the project perform 15 percent better than Title 24.

*Note that these criteria apply to the 2009 program year and may be different in subsequent years.*



# New Solar Homes Partnership

## RESOURCES

### OVERLAP WITH ENERGY EFFICIENCY

This table highlights some of the competitive tax credit points as they relate to including energy efficiency measures in your 2009 projects.

#### Breakdown of Energy Efficiency Points

MEASURE	TAX CREDIT INCENTIVE
Exceed Title 24 energy standards by at least 10 percent	4 points
<ul style="list-style-type: none"> <li>-Use of Energy Star rated ceiling fans in all bedrooms and living rooms</li> <li>-Use of whole house fan</li> <li>-Use of economizer cycle on mechanically cooled HVAC systems</li> </ul>	2 points
Exceed Title 24 energy standards by at least 15 percent	Threshold Basis Limits Boost: Increased funding up to 5 percent of project's Basis Limit
<ul style="list-style-type: none"> <li>-Distributive energy technologies (such as microturbines)</li> <li>-Renewable energy sources (such as solar)</li> </ul>	Threshold Basis Limits Boost: Increased funding up to 5 percent of project's Basis Limit
<ul style="list-style-type: none"> <li>-Use of tankless water heaters</li> <li>-Use of high efficiency condensing boiler (92 percent AFUE or greater)</li> <li>-Use a solar thermal domestic hot water pre-heating system</li> </ul>	Threshold basis increase
-Energy Star qualified appliances, including but not limited to, refrigerators, dishwashers, and clothes washers shall be installed when such appliances are provided	Minimum requirement

### CDLAC PROCEDURES

Federal law limits how much tax-exempt debt a state can issue in a calendar year, with the cap determined by a population-based formula. The California Debt Limit Allocation Committee was created to set and allocate California's annual debt ceiling, and administers the tax-exempt bond program to issue the debt. Tax-exempt debt allocation is distributed among six program areas, the largest two of which are the Qualified Residential Rental Project Program, which assists developers of multifamily rental housing units, and the Single-Family Housing Program which assists first-time homebuyers with their home purchase. Over half of the \$3.3 trillion 2009 debt limit has been allocated to the multifamily rental housing program. Tax-exempt bond financing is required for projects receiving noncompetitive 4% tax credits through TCAC.

NSHP new construction projects have a scoring advantage under current CDLAC Procedures as they must exceed Title 24, Part 6 standards by 15% or more, automatically qualifying them for five points.

*For more information please visit: [www.treasurer.ca.gov/cdlac](http://www.treasurer.ca.gov/cdlac)*

### HUD APPLICATION GUIDELINES

There are some competitive programs where the U.S. Department of Housing and Urban Development (HUD) encourages the use of energy efficient technologies. Put simply, the HUD application guidelines for Section 202/811 Capital Grants must be aligned with TCAC guidelines in terms of timing.

There is pending federal legislation that may affect these guidelines called the Green Resources for Energy Efficient Neighborhoods (G.R.E.E.N). Act.

*For more information and any updates, please visit:*  
[www.govtrack.us/congress/bill.xpd?bill=h110-6078](http://www.govtrack.us/congress/bill.xpd?bill=h110-6078)

### FEDERAL TAX CREDIT INCENTIVES

#### SOLAR INVESTMENT TAX CREDIT (ITC) INCENTIVES

Current Solar Investment Tax Credit (Solar ITC) regulations provide 30 percent of the cost of the system back as a credit to businesses that purchase or invest in qualified solar energy systems. The system must be placed in service by the end of 2016. More information is available at [www.irs.gov](http://www.irs.gov).

### INTEGRATING ENERGY EFFICIENCY, GREEN BUILDING AND SOLAR

The Residential Program Matrix on the next page depicts many of the energy efficiency, green building, solar incentive, marketing, and certifications programs available in the State of California for affordable projects. It is designed to offer a big picture overview of the programs, their cost (if any), processes and their similarities and differences. Programs covered include: Utility new construction energy efficiency incentive programs, ENERGY STAR®, the New Solar Homes Partnership (NSHP), GreenPoint Rated, LEED for Homes, Green Communities and Low-Income Housing Tax Credits.

### DESIGN, CONSTRUCTION AND MAINTENANCE

#### DESIGN AND CONSTRUCTION

There are several things to consider when designing a solar affordable home development. During the design phase, in particular for site analysis, be sure to orient the solar panels so they are unobstructed and generally facing south, though southeast or southwest facing arrays will perform well too.

The developer will also want to make sure that, during the construction drawing phase, the solar PV system is sized in accordance with forecasted electricity consumption. There will need to be sufficient space for the equipment, in particular for an electrical/mechanical room and for mounting solar panels. In addition, it is very important to engage the local fire department jurisdiction early in the design process, since emerging roof space restrictions for firefighter access will need to be considered for PV layouts.

# New Solar Homes Partnership

## RESOURCES

### Residential Program Matrix

Residential Program Matrix									
Program Type:		Geography		Administered / Implemented:		Project Type:		Program Cost:	
Utility EE RNC		ENERGY STAR®		New Solar Homes		GreenPoint Rated		LEED for Homes	
EE Incentive		EE Marketing		Solar PV Incentive		Green Certification		Green Grant	
CA (PG&E, SCE, Sempra)		Nationwide		CA		CA		Nationwide	
IOU's/ICF/HMG		EPA/DOE/IOUs		CEC/IOUs		Build It Green		USGBC (CA = DEG)	
SF + MF	SF + MF	SF + MF	SF + MF	SF + MF	SF + MF	SF + MF	SF + MF	SF + MF	SF + MF
Afford. & Mkt Rate	Afford. & Mkt Rate	Afford. & Mkt Rate	Afford. & Mkt Rate	Afford. & Mkt Rate	Afford. & Mkt Rate	Afford. & Mkt Rate	Afford. & Mkt Rate	Afford. & Mkt Rate	Afford. Only
Free	Free	Free	Free	Free	Free	Free	Free	Free	Free
Funded by Ratepayers	Funded by Ratepayers	Funded by Ratepayers	Funded by Ratepayers	Funded by Ratepayers	Funded by Ratepayers	Funded by Ratepayers	Funded by Ratepayers	Funded by Ratepayers	Funded by Ratepayers
Free	Free	Free	Free	Free	Free	Free	Free	Free	Free
HERS Rater/EC cost	HERS Rater/EC cost	HERS Rater/EC cost	HERS Rater/EC cost	HERS Rater/EC cost	HERS Rater/EC cost	HERS Rater/EC cost	HERS Rater/EC cost	HERS Rater/EC cost	HERS Rater/EC cost
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
\$150-500/u; \$60/u HERS; \$50/unit EC	\$150-500/u; \$60/u HERS; \$50/unit EC	\$150-500/u; \$60/u HERS; \$50/unit EC	\$150-500/u; \$60/u HERS; \$50/unit EC	\$150-500/u; \$60/u HERS; \$50/unit EC	\$150-500/u; \$60/u HERS; \$50/unit EC	\$150-500/u; \$60/u HERS; \$50/unit EC	\$150-500/u; \$60/u HERS; \$50/unit EC	\$150-500/u; \$60/u HERS; \$50/unit EC	\$150-500/u; \$60/u HERS; \$50/unit EC
Baseline:	Baseline:	Baseline:	Baseline:	Baseline:	Baseline:	Baseline:	Baseline:	Baseline:	Baseline:
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(Completion) 5	(Completion) 5	(Completion) 5	(Completion) 5	(Completion) 5	(Completion) 5	(Completion) 5	(Completion) 5	(Completion) 5	(Completion) 5
Program Website	Program Website	Program Website	Program Website	Program Website	Program Website	Program Website	Program Website	Program Website	Program Website
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Program Resources:	Program Resources:	Program Resources:	Program Resources:	Program Resources:	Program Resources:	Program Resources:	Program Resources:	Program Resources:	Program Resources:
flexyourpower.com	flexyourpower.com	flexyourpower.com	flexyourpower.com	flexyourpower.com	flexyourpower.com	flexyourpower.com	flexyourpower.com	flexyourpower.com	flexyourpower.com
h-m-g.com	h-m-g.com	h-m-g.com	h-m-g.com	h-m-g.com	h-m-g.com	h-m-g.com	h-m-g.com	h-m-g.com	h-m-g.com
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gosolarcalifornia.ca.gov	gosolarcalifornia.ca.gov	gosolarcalifornia.ca.gov	gosolarcalifornia.ca.gov	gosolarcalifornia.ca.gov	gosolarcalifornia.ca.gov	gosolarcalifornia.ca.gov	gosolarcalifornia.ca.gov	gosolarcalifornia.ca.gov	gosolarcalifornia.ca.gov
greenpointrated.org	greenpointrated.org	greenpointrated.org	greenpointrated.org	greenpointrated.org	greenpointrated.org	greenpointrated.org	greenpointrated.org	greenpointrated.org	greenpointrated.org
davisenergy.com	davisenergy.com	davisenergy.com	davisenergy.com	davisenergy.com	davisenergy.com	davisenergy.com	davisenergy.com	davisenergy.com	davisenergy.com
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Utility EE RNC

ENERGY STAR®

New Solar Homes

GreenPoint Rated

LEED for Homes

Green Communities

LIHTC-TCAC

EE Incentive

EE Marketing

Solar PV Incentive

Green Certification

Green Grant

Tax Credit Equity

CA (PG&E, SCE, Sempra)

Nationwide

CA

CA

Nationwide

Nationwide/CA

IOU's/ICF/HMG

EPA/DOE/IOUs

CEC/IOUs

Build It Green

USGBC (CA = DEG)

Enterprise

CA TCAC

SF + MF

SF + MF

SF + MF

SF + MF

SF + MF

SF + MF

Afford. & Mkt Rate

Afford. & Mkt Rate

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gosolarcalifornia.ca.gov

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greenpointrated.org

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davisenergy.com

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KEY: EE = Energy Efficiency  
SF= single family

IOU = Investor Owned Utility (PG&E/SCE/SCG/SDG&E)  
u = unit

HERS = Home Energy Rating System

ES = ENERGY STAR

EC = Energy Consultant

Appl. = appliances

MOU = Memorandum of Understanding

Build It Green, and Davis Energy Group. Last updated 10/14/08

LEED-H Rtr thru DEG

**KEY:** EE = Energy Efficiency  
 SF = single family  
 MF = multifamily  
 Find A: HERS  
 IOU = Investor Owned Utility (PG&E/SCE/SCG/SDG&E)  
 u = unit  
 HERS = Home Energy Rating System  
 EC = www.cabec.org/ceperoster.php  
 PV = www.consumerenergycenter.org/eprebate/database  
 GPR = www.buildgreen.org/greenpoint-rated/find-rater  
 LEED-H Rtr thru DEG  
 DEG = Davis Energy Group  
 EC = Energy Consultant  
 Appl. = appliances  
 MOU = Memorandum of Understanding  
 This matrix was compiled by Heschong Mahone Group, Inc. w/assistance from the New Solar Homes Partnership, Build It Green, and Davis Energy Group. Last updated 10/14/08

### OPERATIONS AND MAINTENANCE

Operations and maintenance of solar PV equipment, though minimal, is crucial for longevity and maximum performance. Periodic maintenance service, though generally no more than twice a year, is needed for cleaning panels (depending on the climate), for an annual system acceptance test, and for minor property management requirements. A copy of the maintenance plan is required when submitting the NSHP-2 claim form.

Standard warranties for PV equipment are 20 years for modules and 10 years for inverters. PV system life expectancy is approximately 40 years. Also, monitoring real-time performance and historical production is recommended in addition to proactive, periodic service.

### TRAINING AND OUTREACH

One of the goals of state and utility funding for inclusion of solar systems is to increase public awareness of the advantages of site solar energy. The state, the utilities and several nonprofits provide training and outreach on legal and technical issues to the building community and the inspection community. Building owners are encouraged to provide training to their tenants on system performance and benefits.

One of the best sources for information on training and outreach is the California Solar Center (CSC). They facilitate a regular gathering called the Solar Forum, and maintain on their web site copies of presentations that were made at the forums. The CSC also maintains numerous resources, such as technical manuals, tax credit guidance documents, solar program descriptions and descriptions of state laws affecting solar systems. *For more information, go to: [www.californiasolarcenter.org/solarforum.html](http://www.californiasolarcenter.org/solarforum.html).*

### GREEN RATING SYSTEMS

Green rating systems provide developers with a credible and workable measurement of green components and promote integrated green design practices. Rating systems also provide a seal of quality and recognition of environmental leadership and sustainability within the development industry, for funders, and for local governments and consumers. For more information about local government green building policies and programs, see [www.builditgreen.org/policies](http://www.builditgreen.org/policies).

#### **Additional Resources:**

[www.builditgreen.org](http://www.builditgreen.org)

[www.bayarealisc.org](http://www.bayarealisc.org)

[www.enterprisecommunity.org](http://www.enterprisecommunity.org)

[www.globalgreen.org](http://www.globalgreen.org)

[www.gosolarcalifornia.org](http://www.gosolarcalifornia.org)

[www.greenbuilder.com](http://www.greenbuilder.com)

[www.usgbc.org/leed](http://www.usgbc.org/leed)

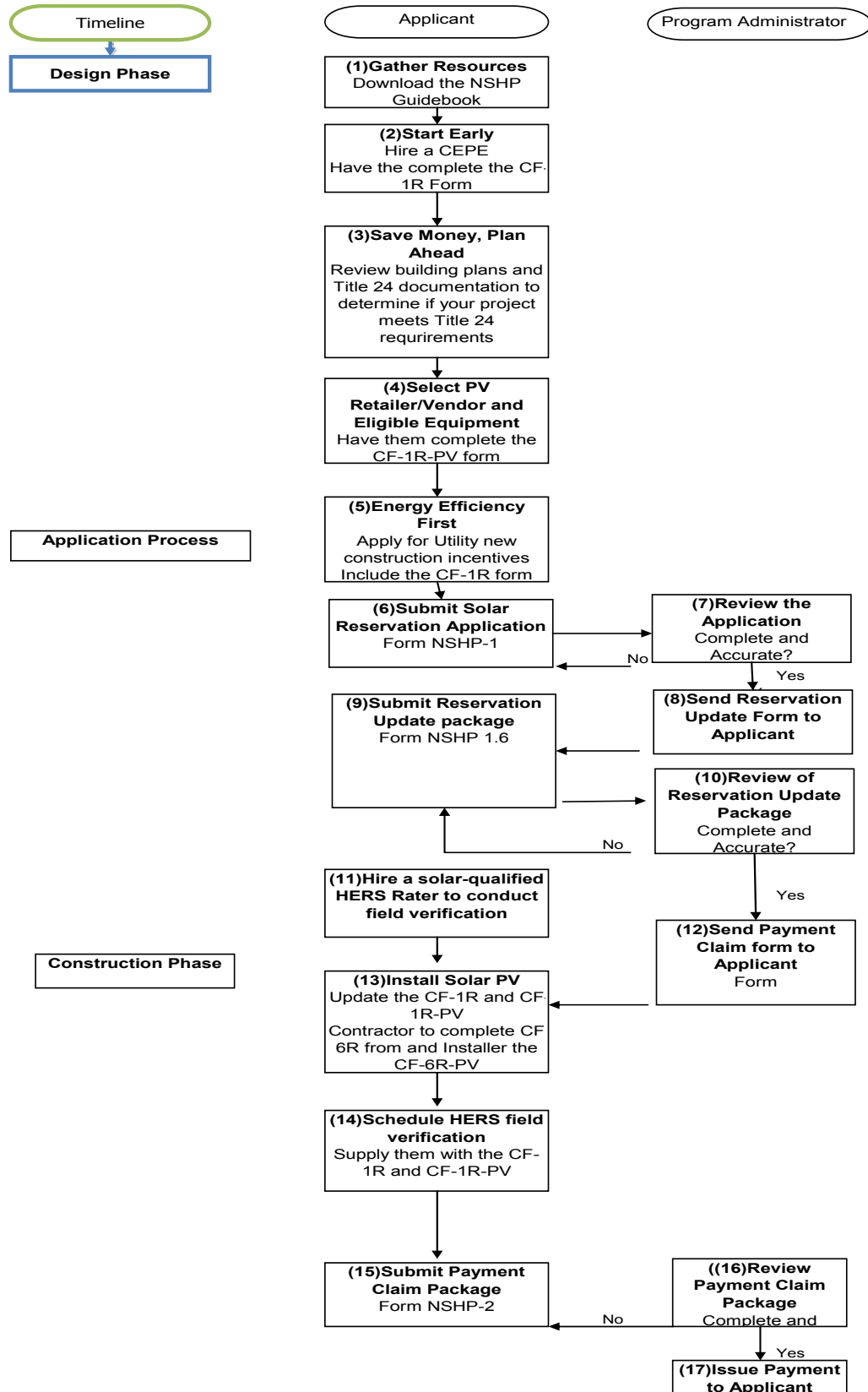
### FLOW CHART OF THE SOLAR PROCESS FOR AFFORDABLE HOME DEVELOPERS

This flow chart will help the affordable home developer walk through the process of getting started and doing the necessary research to incorporate solar into your project. It will also walk the developer through the application, construction and financing process.



# New Solar Homes Partnership

## RESOURCES



### NEW SOLAR HOMES PARTNERSHIP RESOURCES

#### GO SOLAR CALIFORNIA

Provides information on rebates, tax credits and incentives for solar energy systems in California:

[www.gosolarcalifornia.org](http://www.gosolarcalifornia.org)

FOR A LIST OF REGISTERED INSTALLERS, CONTRACTORS AND RETAILERS, VISIT:

[www.gosolarcalifornia.org/retailers/index.html](http://www.gosolarcalifornia.org/retailers/index.html)

FOR A LIST OF ELIGIBLE EQUIPMENT, VISIT:

[www.gosolarcalifornia.org/equipment/index.html](http://www.gosolarcalifornia.org/equipment/index.html)

FOR THE NSHP ONLINE APPLICATION PROCESS, VISIT:

[www.newsolarhomes.org](http://www.newsolarhomes.org)

FOR INFORMATION ON THE HOME ENERGY RATING SYSTEM (HERS), VISIT:

[hersrater.net/hers/index.htm](http://hersrater.net/hers/index.htm)

FOR A LIST OF CERTIFIED ENERGY PLANS EXAMINER, VISIT:

[www.cabec.org/ceperoster.php](http://www.cabec.org/ceperoster.php)

### NEW SOLAR HOMES PARTNERSHIP AND ITS WORKING GROUP MEMBERS

#### BENNINGFIELD GROUP

Specializes in custom software design services, building energy efficiency, code analysis and web tools, as well as energy efficiency program design and implementation.

[www.benningfieldgroup.com](http://www.benningfieldgroup.com)

#### CALIFORNIA COALITION FOR RURAL HOUSING

Advocates efforts to build and preserve affordable housing in rural areas of California.

[www.calruralhousing.org](http://www.calruralhousing.org)

#### COMMUNITY HOUSING WORKS

A San Diego nonprofit that helps people and neighborhoods by providing a full range of housing options combined with training and support.

[www.chworks.org](http://www.chworks.org)

#### ENTERPRISE

Enterprise helps build affordable housing for low-income households by providing financing and expertise to community and housing developers.

[www.enterprisecommunity.org](http://www.enterprisecommunity.org)

#### GLOBAL GREEN USA

Global Green USA is a national leader in promoting green building practices in the affordable homes community. Through its Greening Affordable Housing Initiative, the organization works extensively with nonprofit community development corporations, architects, financial institutions, and government agencies. Resources to assist project sponsors incorporate solar energy into their developments can be found at:

[www.globalgreen.org/greenurbanism/zero](http://www.globalgreen.org/greenurbanism/zero)

#### GRID ALTERNATIVES

Grid Alternatives' mission is to empower communities in need by providing renewable energy efficiency

# New Solar Homes Partnership

## RESOURCES

services, equipment and training.

[www.gridalternatives.org](http://www.gridalternatives.org)

### HOUSING CALIFORNIA

Housing California is the leading voice in the state capitol for affordable homes for all and an end to homelessness. Since 1979, HCA has worked to increase the supply and variety of decent, safe and affordable homes for homeless and low-income families.

[www.housingca.org](http://www.housingca.org)

### HESCHONG MAHONE GROUP

HMG provides professional consulting services in the field of building energy efficiency, whether it be building design, construction technology, policy development or program design.

[www.h-m-g.com](http://www.h-m-g.com)

### US DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT

[www.hud.gov](http://www.hud.gov)

### KEMA

World-wide green building consultants. In the United States KEMA offers green consulting to local governments.

[www.kema.com](http://www.kema.com)

### LOCAL INITIATIVES SUPPORT CORPORATION

LISC helps resident-led, community-based development organizations transform distressed communities and neighborhoods into healthy ones – good places to live, do business, work and raise families. By providing capital, technical expertise, training and information, LISC supports the development of local leadership and the creation of affordable homes, commercial, industrial and community facilities, businesses and jobs.

[www.lisc.org](http://www.lisc.org)

### NON-PROFIT HOUSING ASSOCIATION OF NORTHERN CALIFORNIA

NPH works to advance affordable homes as the foundation for thriving individuals, families and neighborhoods. As the collective voice of those who support, build and operate affordable homes, NPH promotes the proven methods offered by the non profit housing sector and focuses on housing solutions.

[www.nph.org](http://www.nph.org)

### SAN DIEGO HOUSING FEDERATION

A coalition of non profits and other organizations that advocate for affordable homes and community development for low income households.

[www.housingsandiego.org](http://www.housingsandiego.org)

### SOUTHERN CALIFORNIA ASSOCIATION OF NON PROFIT HOUSING

Southern California Association of Non Profit Housing supports the production, preservation and management of homes for low-income households.

[www.scanph.org](http://www.scanph.org)

### YES! SOLAR SOLUTIONS

Yes! Solar Solutions offers a new approach to deploying efficient and eco-friendly photovoltaic solar electric solutions to homeowners and small businesses across the United States.

[www.yessolarsolutions.com](http://www.yessolarsolutions.com)

# Case Studies



### SOLARA, Community Housing Works



#### PROJECT

**SOLARA — Poway, California**

Description of community: Climate Zone 10, inland suburb of San Diego

#### MAKING THE DECISION

Early in planning, Community Housing Works decided that SOLARA would be “green” and include solar, because it was the right thing to do. The decision was supported by the City of Poway. Then the organization set to work to see how this could practically be achieved, in the process creating a replicable template for financing using several sources. They did not know that it would be the first apartment building/development in California that is a Zero Energy New Home, fully powered by PV.

#### CHALLENGE AND SOLUTION

A challenge to using PV for apartment units as well as common area was the intersection of two requirements; 1) affordable homes utility allowances, the set amounts subtracted from maximum rent for utilities that the resident pays. These allowances do not recognize apartment communities that are highly energy efficient, let alone those like SOLARA that are zero energy and include renewables; and 2) regulatory requirements for net metering that ensure each apartment unit has its own PV system rather than distributing all the solar among the apartments. The result required 63 separate PV arrays at SOLARA – each having its own inverter and separate meter. Incentives to encourage PV must include three changes: 1) project-specific utility allowances for affordable homes; 2) regulatory changes to allow the PV to be centrally metered and credit allocated to each apartment; and 3) investor-owned utilities should establish incentive programs such that developments committing to use a substantial amount of PV receive preferential processing on their new construction underground planning approvals.

#### PERFORMANCE RESULTS

There were over 700 people on the interest list for SOLARA’s 56 affordable housing units, and a city-supervised lottery was used. Today, there is a waiting list of approximately 400 families for this development. In the first year of full operation, the 141kW (DC) PV systems at SOLARA produced approximately 187,500 kWh of electricity, or 1330 kWh per kW of PV. The average apartment in SOLARA met 87% of its electricity needs on-site with its PV system. Compared to a conventionally designed project, net electricity consumption is 87% less and electricity bills have been reduced by 68%. Most of this cost savings accrues to the developer, while tenants benefit from a fixed monthly utility charge, insulating them against future energy cost increases and seasonal volatility. SOLARA has been recognized locally and

# New Solar Homes Partnership

## CASE STUDIES

### SOLARA, Community Housing Works

“

SOLARA has been a catalyst, inspiration and a replicable template of how a development team using off-the-shelf technology can achieve a green, carbon neutral, highly energy and water efficient community that is fully powered by PV. California's innovative NSHP rebates combined with the Low Income Housing Tax Credit sustainability incentives provided by the Tax Credit Allocation Committee demonstrate California's leadership in making PV achievable and part of a sustainable future.

— Mary Jane Jagodzinski, Senior Project Manager, Community Housing Works

”

nationally. Community Housing Works was one of ten developments recognized with the highly prestigious 2008 Award of Excellence – The Americas from the Urban Land Institute. SOLARA was recognized with a 2008 Gold Nugget from the Pacific Coast Builders Conference, and was voted Project of the Year (cover story) by Affordable Housing Finance Magazine.

### ABOUT COMMUNITY HOUSING WORKS

Community Housing Works is a San Diego-based non profit organization that provides a full range of housing options, combined with training and support, to help people and neighborhoods move up in the world. CHW has developed and operates more than 1,600 affordable apartments in approximately 30 complexes throughout San Diego County and annually serves more than 4,000 individuals, families and children. Founded in 1982, Community Housing Works is San Diego County's only member of the national Neighbor Works Network®.

#### specifications

CITY: Poway, CA

# OF SOLAR HOMES: 56

UTILITY: San Diego Gas and Electric

AVERAGE SYSTEM SIZE: Apartments approx. 2,000-2,350W depending on size of unit

COST OF THE SYSTEM: \$1,103,000

SUBSIDY: California Energy Commission Rebates \$409,000/Tax Credit boost (9%) \$405,000/Federal Investment Tax Credit (30%) \$208,000/Perm Mortgage \$81,000

ANNUAL ENERGY PRODUCTION: 187,500 kwh or 1,330 kwh per kw of PV

ANNUAL BENEFITS OF THE SYSTEM: Electric bills are down by 68%

MODULE TYPE: Sharp 170

INVERTER: Fronius IG200 and IG400



# New Solar Homes Partnership

## CASE STUDIES

### BRIDGE Housing Corporation



*Located in South San Francisco, this affordable home development offers solar to over 43 affordable homes and is centrally located to local transit, shopping and other community gathering places.*

### PROJECT

#### *Grand Oak Apartments, BRIDGE Housing Corporation*

Grand Oak Apartments, located in South San Francisco, California, is located on a 1.15 acre infill parcel in a residential neighborhood, between the city's downtown and the new BART Station. The site is well located with easy access to shopping, transit and community facilities. The site is roughly rectangular with a point at the acute intersection of Oak Avenue and Grand Avenue. There is a significant grade change over the site with higher grades along Grand and lower grades along Oak.

Van Meter Williams Pollack, the project architect, devised a site plan that allows for considerable density with mostly townhome-style units and two parking spaces per unit, as required by the city. Townhomes with individual stoop entrances line Oak Avenue and step down with the street grade, presenting a friendly residential element to the surrounding neighborhood. Higher density townhome-over-flat portions of the site are shielded from view of the public street behind the street-fronting units. The majority of the parking is in a concrete structure accessed from Oak Avenue and shielded from view by townhomes, with a small surface lot at the south end of the site.

All of the units are affordable to families earning between 20 and 45 percent of the area median income. Rents range from about \$380 to \$1,200 per month, depending on unit size and family income.

### MAKING THE DECISION

BRIDGE has been an early adopter of sustainable development practices in our projects, but prior to Grand Oak had only completed one development with photovoltaic cells, due primarily to funding constraints. PVs were part of the concept from the beginning at Grand Oak, and the funding commitment from the City of South San Francisco for this element meant that BRIDGE could absorb the first cost of the system. Since Grand Oak was completed, BRIDGE has completed one other development with photovoltaics, and have several more under construction and in the pipeline.

# New Solar Homes Partnership

## CASE STUDIES

### BRIDGE Housing Corporation

“

The photovoltaic system at Grand Oak is a win-win-win for BRIDGE, our residents and the environment. Affordable apartments operate on very thin margins, so the ability to generate power on site will make a significant contribution to the long-term stability of Grand Oak. The New Solar Home Partnership rebate made the system feasible and will be a key element in allowing BRIDGE to install more solar electric systems in the future.

— Kevin Griffith, Senior Project Manager for Grand Oak

”

### CHALLENGES AND SOLUTIONS

The main challenge was the design of the buildings. The design of the development is townhome style, with a series of peaked roofs. The solar panels had to be laid out over several roof areas with steep pitches. The shape of the site also prevented orienting the panels for maximum efficiency.

Sun Light and Power got involved early on in the design phase and worked with BRIDGE to design and install the system in a way that works, while minimizing conflicts with other building systems.

### PERFORMANCE RESULTS

First indications (based on less than a full year of operations) are that the system is generating more electricity than was anticipated, and may well generate enough energy to cover all common area-load over the full year.

### ABOUT BRIDGE HOUSING CORPORATION

BRIDGE Housing Corporation, the leading nonprofit developer of affordable homes in California, creates and manages a range of high-quality, affordable homes for working families and seniors. Since it was founded in 1983, BRIDGE has participated in the development of over 13,000 homes serving more than 35,000 Californians. For more information, visit [www.bridgehousing.com](http://www.bridgehousing.com).

#### specifications

CITY: South San Francisco

# OF SOLAR HOMES: 43

UTILITY: Pacific Gas and Electric

AVERAGE SYSTEM SIZE: 29.3 kW

COST OF THE SYSTEM: \$188,568 after rebate. Rebate was \$81,323 so the gross was \$269,891

MAINTENANCE COST: None

BENEFITS OF THE SYSTEM: Increased LP equity of \$7,500 and cost savings of \$10,000/year

ANNUAL ENERGY PRODUCTION: N/A

MODULE TYPE: Mitsubishi 170 W polycrystalline

INVERTER: Sunny Boy, 240 V, 6,000 W

# New Solar Homes Partnership

## CASE STUDIES

### Edes Avenue Development, Habitat for Humanity East Bay



*This volunteer-constructed development offers affordable solar homes to 54 families and will reduce greenhouse gas emissions by over 2,700 tons over the solar systems' projected lifespan, while generating nearly \$900,000 worth of clean renewable energy for low-income homeowners over that same period.*

#### PROJECT

##### *Edes Avenue Development, East Oakland, California*

Habitat for Humanity East Bay's Edes Avenue Development consists of 54 affordable single-family homes in the Sobrante Park neighborhood of east Oakland. The site was a brownfield that historically had been a truck dismantling and recycling yard. This first phase was completed in December 2008 and contains 26 new homes, with a second phase under construction on an adjacent lot for an additional 28 homes to be completed by December 2009. One hundred percent of the homes will be solar powered.

#### MAKING THE DECISION

Habitat for Humanity East Bay is one of the leaders in affordable "green building" in the Bay Area. Habitat builds "green" to take better care of the environment, its homeowners and volunteers. Habitat homes incorporate a variety of green features, including "24 inch on center" framing (which reduces lumber usage by 30 percent), fast growing engineered lumber, 30 percent fly-ash concrete to reduce landfill, energy efficient fixtures and appliances on each home, green landscaping with drought tolerant plants and many more features.

#### CHALLENGES AND SOLUTIONS

Habitat East Bay partnered with GRID Alternatives' volunteer-based solar installation program to install the PV systems and was able to directly incorporate homeowners into the installation process. Not only was this model compatible with Habitat's overall model of self-help housing, this approach enhanced homeowners' knowledge of these relatively complex systems and helped them better understand system maintenance and their new utility bills during their ownership period.

#### PERFORMANCE RESULTS

In terms of sales and homeowner interest, all phases to-date of this project have been heavily oversubscribed with applicants. In terms of public interest, the solar component has been very successful in helping attract additional attention from media and the funding community. In terms of solar electric system performance, the project as a whole will reduce greenhouse gas emissions by over 2,700 tons over the systems' projected life-spans, while generating nearly \$900,000 worth of clean renewable energy for our low-income homeowners over that same period.

# New Solar Homes Partnership

## CASE STUDIES

### Edes Avenue Development, Habitat for Humanity East Bay

“

Habitat East Bay has included active and passive solar technology in many of the homes we have built since 2002.

We feel it is important for us to continue this feature not only for environmentally sustainable reasons, but low-income homeowners benefit greatly from the reduced utility cost.

— Daryl Lee, Habitat for Humanity East Bay

”

### ABOUT HABITAT FOR HUMANITY EAST BAY

Founded in 1988, Habitat for Humanity East Bay was formed as an independent affiliate of Habitat for Humanity International and served Alameda and Contra Costa counties. The organization's mission is to create successful homeownership opportunities for families with limited incomes by building sustainable housing and revitalizing neighborhoods.

As the largest Habitat affiliate in the Bay Area, Habitat East Bay currently builds approximately 20 homes per year. To date, Habitat East Bay has completed the construction of 199 single-family homes in Alameda and Contra Costa counties and funded the construction of 432 additional Habitat homes in more than 20 countries overseas.

Habitat East Bay recently completed a 22-home development in Livermore, a 4-home development in Antioch, 20 homes in east Oakland, and an 8-home development in Alameda and is currently building 6 homes in Oakland. Our developments for 2009-2010 include 28-home and 22-home developments in Oakland, a 9-home development in Bay Point, and a 10-home development in El Sobrante. Having built 200 homes in its first 20 years, our goal is to build the next 200 homes in just 5 years.

#### specifications

CITY: Oakland, CA

# OF SOLAR HOMES: 54

UTILITY: Pacific Gas and Electric

AVERAGE SYSTEM SIZE: 1.7 kW

ANNUAL ENERGY PRODUCTION: (Estimated kWh per home) Approx. 2,840 kWh

COST OF THE SYSTEM: \$14,825

SUBSIDY: \$5,460 per system from the NSHP incentive

ANNUAL BENEFITS OF THE SYSTEM: \$340 per year in electricity savings

MODULE TYPE: Mostly SunPower, except for 6 using either Kyocera or Sharp modules

INVERTER: Mostly SunPower, with the Kyocera and Sharp systems using SunnyBoy

MAINTENANCE COST: None



# Solar In The News



### HOUSING MAKES A HAPPY ENDING

*Affordable Housing Finance • August 2008*

*By Donna Kimura*

SALINAS, CALIF. – Just about everyone with roots in this town’s fertile soil has a story about an old motel on Main Street. It is where local families gathered for wedding receptions and cowboys competing in the annual rodeo took their boots off at night. Years ago, Marilyn Monroe and Joe DiMaggio even stayed at this spot when the upscale Santa Lucia Inn graced the land.

Over time, a new motel was built, and the tales took a notorious turn as the property became the scene for prostitution and drug activity.

“This was a black hole,” said Dana Cleary, director of real estate development for the Community Housing Improvement Systems and Planning Association, Inc. (CHISPA). “It’s a big building. When it was bad, it was big. You couldn’t overlook it.”

CHISPA has written the next chapter in the story. The nonprofit housing developer gutted the troubled motel to its shell and rebuilt it to provide affordable apartments for low-income seniors.

Completed in May, the 124-unit Sherwood Village Senior Apartments makes a major contribution toward helping Salinas meet its goal of providing 500 new seniors units in the next five years, said Paul Tran, project manager.

At the same time, CHISPA has eliminated a huge source of blight on the city’s main thoroughfare. In the three years prior to CHISPA’s conversion, the police responded to a call at the motel every 2.82 days on average.

Sherwood Village also stands as an example of green building. The property features a bioswale to retain and treat storm water. Solar panels power the community areas. High-efficiency heaters have been installed. In addition, 75 percent of the construction and demolition waste was recycled.

The \$22.2 million development’s greatest achievement is providing homes for the seniors, including many former farm workers who labored in the area’s agricultural fields. The one- and two-bedroom apartments are reserved for residents earning no more than 50 percent of the area median income (AMI), including 13 units for those at 30 percent of the AMI and 48 units for those at 45 percent of the AMI. Seven apartments are handicapped accessible. Rents are approximately 36 percent to 67 percent below those at a market-rate senior’s complex.

CHISPA built a new community center, and the services offered include diabetes screening and dental care, English as a second language classes, and legal assistance. There is a bocce ball court and a community garden. Sherwood Village is CHISPA’s single-largest development and its first rehabilitation effort.

The city of Salinas provided about 10 percent of the financing, amounting to \$2.2 million in HOME and Community Development Block Grant funds. AIG SunAmerica Affordable Housing Partners provided about \$15.9 million in low-income housing tax credit equity. Wells Fargo provided a \$10.6 million construction loan, and the California Community Reinvestment Corp. provided a \$4 million permanent loan.



In a creative move, the solar panels will be owned and operated by an outside investor, who will receive a lease for the rooftop space. CHISPA will pay the common area energy bill to the investor instead of the utility company and has the right to purchase the system in 15 years. This arrangement allows the group to benefit from the solar panels without including them in the capital budget.

The development is the start for other changes. The city has assigned property across from the development to be turned into a senior's center, creating an even happier ending for the story of one troubled old motel.

### CALIFORNIA LEADS IN CUSTOMER AND UTILITY SOLAR CAPACITY

*By GreenBiz Staff*

*Published July 28, 2008*

WASHINGTON, D.C. – The Solar Electric Power Association has identified the utilities with the greatest amount of solar capacity, creating a benchmark to compare to in the future.

California has the largest solar capacity by far, but a number of other states found their way into the group's rankings, which list the top 10 utilities over overall, customer-side and utility-side capacity. Customer capacity is energy used for customers' onsite consumption or sold back to the grid. Utility-side is energy distributed by the utility.

The first annual report does not include specific figures for individual utilities, but the Association hopes to release more details next year. The group left specifics out due to concerns over private information and in order to get all the utilities involved in the survey.

More than 50 utilities were asked how much solar capacity they had at the end of 2007. In total, the utilities had capacity for 805 megawatts (MW) of solar energy. The top 10 represented 780 MW of that. Southern California Edison led the utilities by a wide margin, followed by Pacific Gas & Electric Company (Calif.), Nevada Power/Sierra Pacific Power, San Diego Gas & Electric Company (Calif.) and Xcel Energy (Colo.).

On the customer side, Pacific Gas & Electric Company swapped spots with Southern California Edison, followed by San Diego Gas & Electric Company, the Los Angeles Department of Water and Power, and Public Service Electric & Gas Company (N.J.). Customer-side generation totaled 345 MW, 331 MW of which came from the top 10. Customer-side growth is expected to reach 600 MW in 2012.

Southern California Edison again took first place on utility-side capacity, followed this time by Nevada Power/Sierra Pacific Power, Xcel Energy, Arizona Public Service Company and Tucson Electric Power Company. The top 10 represented almost all of the utility-side capacity for all utilities surveyed, accounting for 459 MW of the total 460 MWs.

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The group's full report also breaks the rankings down in separate lists for public and investor-owned utilities. It also looks at how the utilities compare when ranked by MW-per-customer, which slightly shuffles each list.

What the Association also found is that many utilities are investigating more customer-side installations, in which solar systems are sited on and feed into customer facilities, but owned by utilities. Utility-side capacity is also expected to increase in the coming years as large-scale projects that have been announced come online.

The southwest U.S. has the highest potential for solar generation, but in looking at estimated state solar requirements along with how much sun areas of the country receive, the Association expects the top 10 markets for solar in 2015 to be California, New Jersey, Arizona, New Mexico, Pennsylvania, Maryland, North Carolina, Nevada, Hawaii and Colorado.

### STATE REBATES LEAD MORE PEOPLE TO GO SOLAR

*By David R. Baker, Chronicle Staff Writer*

*Tuesday, July 15, 2008*

California has added enough solar power to its electrical grid this year to light a small town, according to an update released Monday on the state's solar rebate program.

Those rebates, which go to businesses and homeowners who put solar panels on their roofs, have funded enough new installations this year to generate 59.4 megawatts of electricity, about enough to juice up 44,550 homes. All told, that's more solar power than was installed in all of 2006, according to the update from the California Public Utilities Commission.

The rebates are the heart of the Go Solar California campaign, which is part of California's larger fight against global warming. Over the campaign's 10-year span, the state will pump \$3.3 billion into financial incentives for Californians who go solar, with the money drawn from utility bills. By the end of that time, the program should fund roughly 3,000 megawatts of new solar generation.

The Go Solar rebates were first offered in January 2007. Since then, the PUC has received 11,653 active applications, for projects capable of generating 251.5 megawatts. If approved, those projects will receive \$635 million of incentives.

"We're on track to grow to 3,000 megawatts," said Molly Tirpak Sterkel, the solar project's supervisor for the Public Utilities Commission. "I have every reason to be very optimistic about the solar program." The PUC handles rebates for existing buildings that add solar power, while a different government agency, the California Energy Commission, handles incentives for new construction. Monday's update covered only rebates overseen by the PUC.

The amount installed through the program this year may not seem like much, since many conventional power plants burning fossil fuels generate 10 times that amount. But if the program continues at its current pace, it will help install 500 megawatts sometime next year, Sterkel said. One megawatt can power 750 homes.

“That’s a big deal,” she said. “That’s the point when everybody should wake up and say, ‘We have avoided building one big natural gas power plant.’”

Whether the program’s current pace will hold up isn’t certain. The PUC has seen a slowdown in recent months, as well as project cancellations. The commission’s update blames the slowdown on the country’s mortgage crisis as well as the uncertainty surrounding federal incentives for renewable power.

The program has not been without controversy. Although the rebates are designed to lower solar prices in the long run by creating a large, competitive solar industry within California, solar remains far more expensive than many other forms of power generation. In addition, a consumer watchdog group on Monday said too many of the rebates have gone to wealthy businesses or affluent homeowners.

“Subsidies should go to the most needy, not the most wealthy,” said Mark Toney, executive director of The Utility Reform Network.

Sterkel said the commission is working on a program that would direct some of the rebate money to low-income housing.

### IT'S ALL GOOD AT THE NEW PLAZA: SUPPORTIVE HOUSING PROVIDES GREEN OASIS ON GRITTY SIXTH STREET

*By John King, Chronicle Urban Design Writer*

*Friday, March 3, 2006*

You don't expect to find one of San Francisco's most humane new buildings at the corner of Sixth and Howard streets, right in the squalid heart of Skid Row.

But that's where the new Plaza Apartments stand stocky and tall — an eight-story cube that not only is designed to provide shelter and support for 106 once-homeless adults but to do so as a showplace of "green" design.

The Plaza, which has its formal opening March 15 now that the tenants are settled in, succeeds on both counts. In the process, it also adds a deceptively rich piece of contemporary design to a South of Market landscape where you're more likely to see someone passed out in an alleyway than pausing to survey the architecture.

The \$22 million complex was developed by the city's Redevelopment Agency to create housing for extremely low-income residents and then tweaked during construction to focus on a chronically homeless population, with space inside for social workers and medical care.

Another goal was to improve the physical environment of Sixth Street, which has languished for decades. Although nonprofit developers have built needed housing in the area and the city has improved the sidewalks and even planted palm trees, there's still an air of forlorn blight.

So the Plaza has retail space for a credit union as well as theater space reserved for Bindlestiff Studio, a nonprofit Filipino American performing arts center that was in the small building that formerly occupied the site.

The final priority at the Plaza is environmental. Concepts such as recycling and energy efficiency were folded into the design work from the start. The architecture and choice of materials were shaped by a desire to attain at least a silver rating from the U.S. Green Building Council's Leadership in Energy and Environmental Design program. Whatever the final score, this would be the first residential building in the city to receive such certification.

As complex as the mix might sound, the result for the passer-by is as simple as can be: a box that's 80 feet wide and 85 feet high. The structure is a concrete grid that's exposed to view; the units within that frame are marked by floor-to-ceiling windows and wood panels in lustrous hues of yellow, red and brown.

The squat shape and concrete will put off people who think that the result is too stark or that it doesn't look homey. But a closer look reveals eye-catching layers of interest.

There's no obvious pattern to the colored panels, for instance, and it's hard to tell what they're made of. Nor are the facades along each street as monotonous as they seem: On Sixth Street the panels are flush with the concrete frame, but on Howard Street they pull back and the windows are in the

foreground. A 5-foot-wide notch slices each side of the building from the sidewalk to the roof. On the top floor above Sixth Street, there's a 25-foot-wide, 12-foot-deep incision.

Some of the moves are pure style, such as the seemingly random mix of colors. Most are driven by practical goals.

The vertical notches reveal large windows that help tenants orient themselves from the inside hallways, while the missing rooftop piece clears space for a deck next to the communal laundry. The windows on Sixth Street are recessed so that the building's frame provides a bit of shade on summer afternoons. Making them flush with the facade on Howard allows for as much winter sun as possible to enter the apartments.

As for those oddly lustrous panels, they're not plain wood. Recycled craft paper was covered in a veneer of fast-growing ayau wood and then impregnated in resin so the vivid sheen won't fade. The quest for sustainability leaves its mark throughout the project — from the courtyard that filters all its water runoff into the soil to the rooftop solar panels that provide the equivalent of 12 percent of the project's energy needs.

Inside, there are such touches as recycled rubber flooring in the bathrooms. The structural steel has 25 percent recycled content. All the cabinetry consists of wheat board instead of plywood. The designers — a collaboration of Leddy Maytum Stacy Architects and Paulett Taggart Architects, both of San Francisco — even turned the square form to their advantage.

The elevator and stairway are in the central core of the structure, with 17 units per floor lined up around them in a sort of pinwheel arrangement. As a result, the corridors are short and easily navigated. The 300-square-foot apartments are compact but inviting, with plenty of light as well as discreet vents that allow for natural ventilation.

"The sustainable strategy is an integral part of the building," says Roberto Sheinberg, the project architect. "We didn't want it to be a green billboard."

That's a key point.

What's important here isn't that the architects and the city have done the "right" thing. It's that the emphasis on sustainability made everyone think harder about what they were doing.

By searching for materials and a building form uniquely suited to the challenge at hand, the designers crafted a structure of lasting warmth and presence. There's a creative depth you don't find in most residential projects, including condominium complexes stuffed with seven-figure units.

In a dicey location such as Sixth Street, the Plaza Apartments could have been designed as a fortress. Instead, they're a vote of confidence in the future — the future of the neighborhood, and a design future where environmentalism and architecture are fused together so tightly they can't be pulled apart.

### CONSIDER THE AVAILABILITY OF GREEN PRODUCTS: SOLARA, SAN DIEGO, CALIFORNIA

*The 2007 ULI/Charles H. Shaw Forum on Urban Community Issues*

*October 4–5, 2007*

*Prepared by Deborah L. Myerson*

*Community Catalyst Report*

Incorporating green design into a development often requires specialized products, which are often not readily available. Although Energy Star appliances and low-E windows are commonly available, other products can be limited in their availability or may vary widely by market. These limitations can translate into delays in delivery that can in turn have a significant impact on the timeline for completion of a project. In addition, the quality of green products varies. Forum participants noted the need to fight against green washing campaigns—marketing efforts to promote products that sound green, but produce little, if any, savings in energy use, water use, or waste. Forum participants lamented the lack of an equivalent of Consumer Reports for green materials. The supply of green products is expected to increase as local adoption of green building standards spreads and home buyers and renters become more aware of the benefits of living in green buildings. With more demand, the market will attract more suppliers which, in turn, will result in more competitive pricing.

SOLARA, located in the San Diego suburb of Poway in southern California, is the state's first fully solar-powered apartment community. The property consists of 56 affordable apartment units of one, two, and three bedrooms and a 2,100-square-foot community center. Resident households must have incomes of no more than 30 percent to 60 percent of the area median income, and pay rents of \$388–\$1,075 per month, including utilities. SOLARA's green design and reliance on solar power avoid the production of 1,800 tons of carbon dioxide each year that it would generate with traditional fuels—95 percent less than a conventionally powered community. The property is unique in the United States among affordable and market-rate multifamily properties in that SOLARA already meets the 2030 Challenge of carbon neutrality.

The developer is Community Housing Works (CHW), a San Diego-based nonprofit organization that provides affordable housing, training, and support. CHW has developed and operates 1,500 affordable apartments in 28 properties throughout San Diego County. For SOLARA, CHW selected Global Green USA, a Santa Monica-based environmental organization that seeks to slow global climate change by creating green buildings, to be the project's adviser on green building. Global Green provided CHW with technical assistance on solar power, energy efficiency, and green building design as well as on energy tax credits and incentive programs.

Rooftop photovoltaic arrays of 142 kilowatts produce approximately 90 percent of SOLARA's electricity. Some days, the apartment complex even generates surplus electricity for the region's power grid.



In addition to solar power, the project has other green features:

- Energy-efficient materials and appliances such as Energy Star windows and appliances, SEER 13 and 14 air conditioners that use Puron coolant, and high-efficiency, gas-fired tankless boilers that provides hot water and hydronic (central air) space heating.
- Widespread water conservation, including low-flow, dual-flush toilets and the use of a high percentage of California native plants that are drought tolerant and flourish in the local climate and ecosystem.
- Use of recycled materials throughout the building and in public art.
- Building siting to maximize southern exposure
- Design to support healthy indoor air quality, including green-label carpet, recycled fabric carpet padding, linoleum in kitchens, bathrooms, and entryways, and formaldehyde-free insulation and cabinet fronts.
- Energy efficiency in the building envelope, including a radiant barrier and low E double-pane windows with U35 rating.
- The installation of pin fluorescent lighting in nearly all electrical fixtures inside and out, as well as a utility light bulb exchange for residents to exchange incandescent bulbs for compact fluorescent bulbs.
- Shopping carts supplied to all residents, to encourage walking to shopping and services.
- Resident green education programs, including an innovative green curriculum provided in the Learning Center for children and adults, and a mandatory green orientation training of all residents before they move in.

Completed in March 2007, SOLARA is the first project produced as part of the California Energy Commission's Zero Energy New Homes program. As part of an effort to create a viable example of cost-effective green construction for developers, the energy commission provided a rebate of \$409,000 toward the \$1.103 million cost of the photovoltaic panels in the \$18.4 million project. The developers estimate that they will recover the added cost of the solar panels in seven years. Other than the cost of the panels, the overall cost of the development was in line with costs of other properties in the area.

### SOLAR GOOD FOR AFFORDABLE HOMES; GOOD COMMUNITY DEVELOPMENT

THE CALIFORNIA ENERGY COMMISSION'S NEW SOLAR HOMES PARTNERSHIP (NSHP) IS PART OF THE COMPREHENSIVE STATEWIDE SOLAR PROGRAM, KNOWN AS THE CALIFORNIA SOLAR INITIATIVE.

*By Nehemiah Stone*

There is a misconception among builders and developers in California that investment in energy efficiency and renewable energy raises the cost of construction so much that residences can no longer be kept affordable. Developers often argue that it is important to build more affordable homes, and that money spent on energy efficiency would reduce the amount of homes they could build. This line of reasoning is erroneous on two counts. First, energy efficiency does not always have to add significant costs to affordable home construction. Second, if the tenants cannot afford the utility bills, then they are not affordable homes.

With the various federal and state incentives available, building affordable energy efficient solar communities is very much possible. In addition to the direct savings builders and developers can experience, there are significant financial benefits to the community at large.

Redevelopment agencies all across America get state and federal funds to foster economic growth in distressed neighborhoods. Most often these funds are used for building or repairing infrastructure, participating in development of new affordable homes, or supporting local businesses. While all of these are positive, none has the community building power of investing in energy efficiency for affordable homes. What lies at the heart of this truth (based on data from the California Department of Finance) is the fact that nearly three quarters of every dollar spent on utilities leaves the local community, while approximately three quarters of every dollar spent on the average grocery basket of goods stays in the community and is spent again, and again.

“With the various federal and state incentives available, building affordable energy efficient solar communities is very much possible.”

In California, the utilities operate energy efficiency programs that work with affordable home developers to reduce the cost of energy efficiency upgrades. This often reduces the cost of the upgrades to a level that represents a one year payback.

Said differently, after accounting for the utility incentives, \$1 spent on efficiency improvements results in \$1/year savings for tenants on their energy bills. So if a redevelopment agency were to invest \$10,000 on energy efficiency improvements for affordable homes in their community, there would be a direct benefit to those tenants of \$10,000 in the first year (and every year thereafter). But even more importantly, beyond the \$10,000 benefits that the tenants would realize, the community would receive a \$1.87 net benefit for every dollar the tenants did not have to spend on energy, for a net impact to the community of \$18,700 per year from a \$10,000 investment.

The redevelopment agency would be hard pressed to find a better return on their investment.

When it comes to solar, it is still true that every dollar that a solar system on an affordable home saves the tenants will result in a net gain to the community of \$1.87. But the cost of PV systems, the rebates for them, and the link to tenants' bills (and savings) are less standardized.

The buy down (rebate) amount for solar on affordable homes is offered through the California Energy Commission's New Solar Homes Partnership (NSHP) covers about half of the cost of PV, but it is not the only economic incentive, and the impact of all the incentives, and the impact of all the incentives (e.g., federal solar tax credits, LIHTC's, etc.) added together, while exceedingly variable, can get the net cost for affordable home owners down to about \$1/ Watt. Given that scenario, a redevelopment agency investment of \$10,000 in solar for affordable homes would result in \$2,000/year of direct tenant benefit, and \$3740/year in local economic activity, providing a payback in under three years.

Builders, developers and community redevelopment agencies should examine the potential impacts of both energy efficiency and solar investments designed to reduce energy costs for affordable homes.

# Glossary



### GLOSSARY

**CALIFORNIA SOLAR INITIATIVE (CSI)** – The California Solar Initiative program pays incentives to solar photovoltaic (PV) projects in the three California IOU service territories. The program was authorized by the California Public Utilities Commission (CPUC) and Senate Bill 1 (SB 1). Responsibility for administration of the CSI Program is shared by Pacific Gas and Electric Company, Southern California Edison Company, and the California Center for Sustainable Energy (CCSE, formerly known as San Diego Regional Energy Office) for SDG&E customers.

**CALIFORNIA UTILITY ALLOWANCE CALCULATOR (CUAC)** – A project based utility allowance calculator that takes into account specific energy efficiency measures and PV installations that affect tenant-paid utility bills. The CUAC was developed by the Energy Commission to help developers make more accurate estimates of tenants' utility costs. It can help affordable housing developers realize a reasonable rate of return on their investments in energy efficiency and PV, thereby increasing the likelihood that they will make the investments.

**CEPE (CERTIFIED ENERGY PLANS EXAMINER)** – CEPEs are certified by the California Association of Building Energy Consultants and will offer their assistance in Title 24 Building Energy Efficiency Standards compliance analysis and energy efficiency documentation for the NSHP.

**CHECKPOINT REQUIREMENTS** – Status check points will take place every six months to ensure the project's progress is on schedule and provides for sufficient time for the installation of the PV system.

**ENERGY EFFICIENCY BASED UTILITY ALLOWANCES (EEBUA)** – Alternative utility allowance schedules adopted by local housing authorities (PHAs) for third-party verified energy efficient projects, and meant to represent a conservative estimate of energy efficiency for the typical kinds of projects built in the PHA's territory. EEBUAs bring utility allowances more in line with utility costs for energy efficient projects.

**EXPECTED PERFORMANCE BASED INCENTIVE (EPBI)** – This incentive determines the expected performance of your solar system based on geographic location, orientation, tilt, shading and equipment for solar PV systems. The amount of the incentive is based on the PV Calculator. It is a specific dollars-per-watt amount.

**HERS RATER** – A HERS Rater is accredited by one of the HERS Providers to perform independent third-party field verification and diagnostic testing of the energy system.

**HOME ENERGY RATING SYSTEM (HERS) PROVIDER** – One of the three entities authorized by the California Energy Commission to accredit HERS Raters. The HERS system includes field verification or efficiency measures, performance analysis, and diagnostic testing of energy efficiency measures, including solar systems. See the Energy Commission's web site for more information on approved HERS Providers.

**NET METERING** – Refers to the ability of the customer to use electric generation at their own site to offset consumption over a billing period – by allowing electric meters to turn backwards when the site produces electricity in excess of demand. CPUC rules require that all new multifamily dwellings have individual electric meters so developers who want to incorporate solar in multifamily projects are faced with choosing between individual net-metered systems, PV that serves the common area only, third-party-owned systems with a PPA, or virtual net metering. See Section 4.2 for a more complete explanation of each of these paths.

**NEW SOLAR HOMES PARTNERSHIP (NSHP)** – Provides financial incentives and other support for installing eligible solar photovoltaic systems on new residential buildings that receive electricity from specified investor-owned utilities.

**NSHP PV CALCULATOR** – The NSHP PV Calculator generates an estimate of monthly kWh production and annual TDV (kWh) production for the specified solar system. It also determines the appropriate incentive amount as calculated by the expected performance based incentive. [www.GoSolarCalifornia.org/nshpcalculator/index.html](http://www.GoSolarCalifornia.org/nshpcalculator/index.html)

**PHOTOVOLTAIC (PV)** – Refers to the panels (cells) of semiconductor material that absorb sunlight and turn it into electricity that provide energy for solar systems.

**PROJECT-SPECIFIC UTILITY ALLOWANCE (PSUAs)** – See CUAC definition.

**THRESHOLD BASIS LIMITS (TBL)** – The maximum allowed project cost for which tax credits can be earned.

**TITLE 24** – A California regulation that specifies building energy efficiency standards for items such as lighting, roofing, windows etc.

*For additional glossary definitions about California's solar programs, please refer to the California Solar Initiative Handbook at:*

*[www.cpuc.ca.gov/NR/rdonlyres/090852E1-6290-4C1F-8E97-02F60A9CDE8D/0/C](http://www.cpuc.ca.gov/NR/rdonlyres/090852E1-6290-4C1F-8E97-02F60A9CDE8D/0/C)*

*[SI\\_Handbook\\_January\\_2009final\\_2\\_.pdf](#)*



# Explanation of Forms



### EXPLANATION OF FORMS

For more information and to download these forms, please visit: [www.gosolarcalifornia.org/documents/nsdp.html](http://www.gosolarcalifornia.org/documents/nsdp.html).

#### NSDP-1: RESERVATION APPLICATION FORM

This form ensures that a developer can reserve a rebate for their project. Identifies the information needed about the proposed development and specifies what information must be submitted with the application. The applicant must identify the electric utility providing electric service to the development. The form must be signed by the builder.

#### NSDP-1.6: GENERAL APPROVAL/6-MONTH RESERVATION UPDATE FORM

A conditional application only for applicants that qualify for Solar as Standard Feature Incentive and who obtain a 36-month reservation, and who don't provide an equipment purchase commitment. It permits the applicant to submit the equipment agreement six months after approval, when an NSDP-2 form will be provided to applicant.

#### NSDP-2: PAYMENT CLAIM FORM

This combination approval and claim form must be signed by parties entering into the equipment purchase agreement and installation contracts. Any changes to information provided in the NSDP-1 must be included in this form. This form must be returned to the Energy Commission by mail.

#### CF-1R: A FORM TO BE COMPLETED BY YOUR CEPE THAT ANALYZES ENERGY EFFICIENCY MEASURES

A form that must be submitted with the Energy Commission-approved Title 24 compliance software program. The associated input file must be submitted with the CF-1R form as well. The CF-1R form must be consistent with the construction plan-set. All energy efficiency information must be submitted by a CEPE.

#### CF 1R-PV: CERTIFICATE OF COMPLIANCE FORM

An output report that is completed by your CEPE that analyzes your PV system by using the PV Calculator. Analysis is based on module, inverter and meter types, as well as shading, sun and air.

#### CF-4R: CERTIFICATE OF FIELD VERIFICATION AND DIAGNOSTIC TESTING

A form completed by the HERS rater that includes information on diagnostic testing and field verification for each of the energy efficient measures needed to meet Tier one or two levels. This form must be generated through the data registry system of an Energy Commission approved HERS Provider.

#### CF-4R-PV: CERTIFICATE OF FIELD VERIFICATION AND DIAGNOSTIC TESTING FOR PV SYSTEMS

A form used by the HERS rater for field verification and diagnostic testing of each solar system. The HERS rater must independently verify that his/her analysis is consistent with the CF-1R-PV. The HERS rater must provide a copy of this form to the builder and the HERS provider.

# New Solar Homes Partnership

## EXPLANATION OF FORMS

### CF-6R: INSTALLATION CERTIFICATE FORM FOR ENERGY EFFICIENT FEATURES

This must be provided to the HERS rater by the builder for each residential building. Applicants may be required to submit this form to the Energy Commission or its agents upon request.

### CF-6R-PV: INSTALLER CERTIFICATION FORM FOR PV SYSTEMS

This analysis is completed after the solar system installation and is performed by a PV installer. The PV installer will perform diagnostic testing and field verification for each solar system. The PV installer also verifies the consistency of the CF-1R-PV. A copy of the CF-6R-PV will be provided to the builder and the HERS rater once the PV system requirement is met.

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*Governor*  
Arnold Schwarzenegger

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For information on the **New Solar Homes Partnership**  
or Solar Incentives new residential construction visit:

**[www.GoSolarCalifornia.org](http://www.GoSolarCalifornia.org)**

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